

(1390 REV. 5-93) US DEPT. OF COMMERCE PATENT & TRADEMARK OFFICE		ATTORNEY'S DOCKET NUMBER 110652
TRANSMITTAL LETTER TO THE UNITED STATES DESIGNATED/ELECTED OFFICE (DO/EO/US) CONCERNING A FILING UNDER 35 U.S.C. 371		U.S. APPLICATION NO. (if known, sec 37 C.F.R. 1.5)
		09/936923
INTERNATIONAL APPLICATION NO. PCT/FR00/00738	INTERNATIONAL FILING DATE March 23, 2000	PRIORITY DATE CLAIMED March 23, 1999
TITLE OF INVENTION FLAME-RETARDED PLASTIC COMPOSITION, YARN AND TEXTILE STRUCTURE COATED THEREWITH		
APPLICANT(S) FOR DO/EO/US Isabelle CONESA, Francois-Xavier DAMOUR		
Applicant herewith submits to the United States Designated/Elected Office (DO/EO/US) the following items and other information:		
1. <input checked="" type="checkbox"/> This is a FIRST submission of items concerning a filing under 35 U.S.C. 371. 2. <input type="checkbox"/> This is a SECOND or SUBSEQUENT submission of items concerning a filing under 35 U.S.C. 371. 3. <input checked="" type="checkbox"/> This express request to begin national examination procedures (35 U.S.C. 371(f)) at any time rather than delay examination until the expiration of the applicable time limit set in 35 U.S.C. 371(b) and PCT Articles 22 and 39(1). 4. <input checked="" type="checkbox"/> A proper Demand for International Preliminary Examination was made by the 19th month from the earliest claimed priority date. 5. <input checked="" type="checkbox"/> A copy of the International Application as filed (35 U.S.C. 371(c)(2)) a. <input type="checkbox"/> is transmitted herewith (required only if not transmitted by the International Bureau). b. <input checked="" type="checkbox"/> has been transmitted by the International Bureau. c. <input type="checkbox"/> is not required, as the application was filed in the United States Receiving Office (RO/US) 6. <input checked="" type="checkbox"/> A translation of the International Application into English (35 U.S.C. 371(c)(2)). 7. <input type="checkbox"/> Amendments to the claims of the International Application under PCT Article 19 (35 U.S.C. 371(c)(3)) a. <input type="checkbox"/> are transmitted herewith (required only if not transmitted by the International Bureau). b. <input type="checkbox"/> have been transmitted by the International Bureau. c. <input type="checkbox"/> have not been made; however, the time limit for making such amendments has NOT expired. d. <input type="checkbox"/> have not been made and will not be made. 8. <input type="checkbox"/> A translation of the amendments to the claims under PCT Article 19 (35 U.S.C. 371(c)(3)). 9. <input type="checkbox"/> An oath or declaration of the inventor(s) (35 U.S.C. 371(c)(4)). 10. <input type="checkbox"/> A translation of the annexes to the International Preliminary Examination Report under PCT Article 36 (35 U.S.C. 371 (c)(5)). Items 11. to 16. below concern other document(s) or information included: 11. <input checked="" type="checkbox"/> An Information Disclosure Statement under 37 CFR 1.97 and 1.98. 12. <input type="checkbox"/> An assignment document for recording. A separate cover sheet in compliance with 37 CFR 3.28 and 3.31 is included. 13. <input checked="" type="checkbox"/> A FIRST preliminary amendment. <input type="checkbox"/> A SECOND or SUBSEQUENT preliminary amendment. 14. <input type="checkbox"/> A substitute specification. 15. <input type="checkbox"/> Entitlement to small entity status is hereby asserted. 16. <input type="checkbox"/> Other items or information:		

U.S. APPLICATION NO. (if known, use 37 C.F.R. 1.5) 09/936923		INTERNATIONAL APPLICATION NO. PCT/FR00/00738		ATTORNEY'S DOCKET NUMBER 110652	
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17. <input checked="" type="checkbox"/> The following fees are submitted: Basic National fee (37 CFR 1.492(a)(1)-(5)): Search Report has been prepared by the EPO or JPO\$860.00 International preliminary examination fee paid to USPTO (37 CFR1.482)\$690.00 No international preliminary examination fee paid to USPTO (37 CFR 1.482) but international search fee paid to USPTO (37 CFR 1.445(a)(2))\$710.00 Neither international preliminary examination fee (37 CFR 1.482) nor international search fee (37 CFR 1.445(a)(2)) paid to USPTO\$1,000.00 International preliminary examination fee paid to USPTO (37 CFR 1.482) and all claims satisfied provisions of PCT Article 33(2)-(4)\$ 100.00 ENTER APPROPRIATE BASIC FEE AMOUNT =				CALCULATIONS		PTO USE ONLY	

Surcharge of \$130.00 for furnishing the oath or declaration later than <input type="checkbox"/> 20 <input type="checkbox"/> 30 months from the earliest claimed priority date (37 CFR 1.492(e)).				\$	
Claims	Number Filed	Number Extra	Rate		
Total Claims	13 - 20 =	0	X \$ 18.00	\$	
Independent Claims	1 - 3 =	0	X \$ 80.00	\$	
Multiple dependent claim(s)(if applicable)			+ \$270.00	\$	
TOTAL OF ABOVE CALCULATIONS =				\$860.00	
Reduction by 1/2 for filing by small entity, if applicable.				-	\$
SUBTOTAL =				\$860.00	
Processing fee of \$130.00 for furnishing the English translation later than <input type="checkbox"/> 20 <input type="checkbox"/> 30 month from the earliest claimed priority date (37 CFR 1.492(f)).				\$	
TOTAL NATIONAL FEE =				\$860.00	
				Amount to be refunded	\$
				Charged	\$

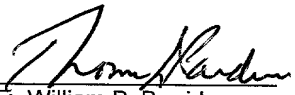
a. ☒ Check No. 122938 in the amount of \$860.00 to cover the above fees is enclosed.

b. ☐ Please charge my Deposit Account No. _____ in the amount of \$_____ to cover the above fees. A duplicate copy of this sheet is enclosed.

c. ☒ The Director is hereby authorized to charge any additional fees which may be required, or credit any overpayment, to Deposit Account No. 15-0461. A duplicate copy of this sheet is enclosed.

NOTE: Where an appropriate time limit under 37 CFR 1.494 or 1.495 has not been met, a petition to revive (37 CFR 1.137(a) or (b)) must be filed and granted to restore the application to pending status.

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 NAME: William P. Berridge
 REGISTRATION NUMBER: 30,024

Date: September 20, 2001

NAME: Thomas J. Pardini
 REGISTRATION NUMBER: 30,411

PATENT APPLICATION

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re the Application of

Isabelle CONESA, Francois-Xavier DAMOUR

Application No.: US National Stage of PCT/FR00/00738

Filed: September 20, 2001

Docket No.: 110652

For: FLAME-RETARDED PLASTIC COMPOSITION, YARN AND TEXTILE
STRUCTURE COATED THEREWITHPRELIMINARY AMENDMENTDirector of the U.S. Patent and Trademark Office
Washington, D. C. 20231

Sir:

Prior to initial examination, please amend the above-identified application as follows:

IN THE SPECIFICATION:

Page 3, line 37 to page 4, line 5, delete current paragraph and insert therefor:

According to the invention, this compatibility is obtained when the plastisol exhibits, at low shear rates, for example less than $300 - 400 \text{ s}^{-1}$, Newtonian-type behavior with a viscosity of less than or equal to 6000 mPa.s , measured using a Brookfield RVT viscometer at 20 revolutions per minute, and, at high shear rates, for example greater than $10\,000 \text{ s}^{-1}$, pseudoplastic-type behavior.

IN THE CLAIMS:

Please replace claims 7, 9 and 11-13 as follows:

7. (Amended) A flame-retarded composite yarn comprising a core made of a material of low combustibility, for example a halogen-free material, and a sheath made of resin, characterized in that it is capable of being obtained by coating said core with the flame-retarded composition as claimed in claim 1.

9. (Amended) A composite structure comprising a substrate of low combustibility, for example a halogen-free substrate, and at least one layer of resin, characterized in that it is capable of being obtained by coating the substrate with a flame-retarded composition as claimed in claim 1.
11. (Amended) A sun screen comprising a textile structure as claimed in claim 9.
12. (Amended) A sign comprising a textile structure as claimed in claim 9.
13. (Amended) A covering for walls or ceilings, comprising a textile structure as claimed in claim 9.

REMARKS

Claims 1-13 are amended. By this Preliminary Amendment, the specification is amended and claims 7, 9 and 11-13 are amended to eliminate multiple dependencies. Prompt and favorable consideration on the merits is respectfully requested.

The attached Appendix includes marked-up copies of each rewritten paragraph (37 C.F.R. §1.121(b)(1)(iii)) and claim (37 C.F.R. §1.121(c)(1)(ii)).

Respectfully submitted,



William P. Berridge
Registration No. 30,024

Thomas J. Pardini
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WPB:TJP/zmc
Attached: APPENDIX
Date: September 20, 2001

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APPENDIX

Changes to Specification:

Page 3, line 37 to page 4, line 5:

According to the invention, this compatibility is obtained when the plastisol exhibits, at low shear rates, for example less than $300 - 400 \text{ s}^{-1}$, Newtonian-type behavior with a viscosity of less than or equal to 6000 mPa.s , measured using a Brookfield RVT viscometer at 20 revolutions per minute, and, at high shear rates, for example greater than $10\,000 \text{ s}^{-1}$, pseudoplastic-type behavior.

Changes to Claims:

The following are marked-up versions of the amended claims:

7. (Amended) A flame-retarded composite yarn comprising a core made of a material of low combustibility, for example a halogen-free material, and a sheath made of resin, characterized in that it is capable of being obtained by coating said core with the flame-retarded composition as claimed in claim 1 ~~any one of claims 1 to 6~~.

9. (Amended) A composite structure comprising a substrate of low combustibility, for example a halogen-free substrate, and at least one layer of resin, characterized in that it is capable of being obtained by coating the substrate with a flame-retarded composition as claimed in claim 1 ~~any one of claims 1 to 6~~.

11. (Amended) A sun screen comprising a textile structure as claimed in claim 9-
~~or 10~~.

12. (Amended) A sign comprising a textile structure as claimed in claim 9-~~or 10~~.

13. (Amended) A covering for walls or ceilings, comprising a textile structure as claimed in claim 9-~~or 10~~.

Rec'd PCT/PTO 03 DEC 2001 #3

PATENT APPLICATION

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re the Application of

Isabelle CONESA et al.

Application No.: 09/936,923

Filed: December 3, 2001

Docket No.: 110652

For: FLAME-RETARDED PLASTIC COMPOSITION, YARN AND TEXTILE
STRUCTURE COATED THEREWITH

SUPPLEMENTAL PRELIMINARY AMENDMENT

Director of the U.S. Patent and Trademark Office

Washington, D. C. 20231

Sir:

Prior to initial examination, please amend the above-identified application as follows:

IN THE CLAIMS:

Please add new claims 14-24 as follows:

--14. A process for obtaining a yarn comprising a core and a plastic sheath comprising a halogen-free fire-retarded composition, consisting of at least one acrylic resin and an intumescent agent which are dispersed in a plasticizing medium, which process is characterized in that:

- a) a die suitable for passage of the core of said yarn is used;
- b) the plastic composition is used in the ungelled plastisol state;

c) the core of the yarn is passed through said die, with a peripheral distribution of the plastisol around said core;

d) the rheological properties of the plastisol at the shear rate of the die, at least equal to $20\,000\text{ s}^{-1}$, are adapted by formulating said ungelled plastisol so that at low shear rate, at most equal to 400 s^{-1} , it exhibits a Newtonian-type behaviour, with a viscosity of less than or equal to $6\,000\text{ mPa.s}$, measured with a Brookfield RVT viscometer at 20 rpm, and at high shear rate, at least equal to $10\,000\text{ s}^{-1}$, it exhibits a pseudoplastic-type behaviour;

e) the gelling of the fire-retarded composition is carried out.--

--15. The process as claimed in claim 14, characterized in that the weight proportion of the plasticizing medium in the plastisol comprising a phthalate is at most equal to 200% with respect to the weight of acrylic resin and/or the weight proportion of the intumescent agent is at most equal to 200% with respect to the weight of acrylic resin.--

--16. The process as claimed in claim 14, characterized in that the plasticizing medium comprises predominantly, by weight, an organic phosphate.--

--17. The process as claimed in claim 14, characterized in that the proportion by weight of the plasticizing medium in the plastisol is between 100 and 200%, and preferably between 120 and 145%, by weight of resin.--

--18. The composition as claimed in claim 14, characterized in that the proportion by weight of the intumescent agent in the plastisol is between 50 and 200%, and preferably between 150 and 200%, by weight of resin.--

--19. A flame-retarded composite yarn with a sheath made of resin and of low combustibility, for example a halogen-free material, characterized in that it is capable of being obtained by the process as claimed in claim 14.--

--20. The yarn as claimed in claim 19, characterized in that the material of the core is a continuous glass filament.--

- 21. A textile structure in which yarns as claimed in claim 20 are assembled or entangled.--
- 22. A sun screen comprising a textile structure as claimed in claim 22.--
- 23. A sign comprising a textile structure as claimed in claim 22.--
- 24. A covering for walls or ceilings, comprising a textile structure as claimed in claim 22.--

REMARKS

Claims 1-24 are pending. By this Preliminary Amendment, claims 14-24 are added.

Prompt and favorable consideration on the merits is respectfully requested.

Respectfully submitted,



William P. Berridge
Registration No. 30,024

Thomas J. Pardini
Registration No. 30,411

WPB:TJP/zmc

Date: December 3, 2001

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Flame-retarded plastic composition, yarn and textile
structure coated therewith

5 The present invention relates to a halogen-free
flame-retarded composition intended for coating a
substrate, for example yarns or textile structures, in
order to meet all particular specifications or
applications, for example for the manufacture of sun
10 screens such as blinds or curtains. More specifically,
the invention relates to a flame-retarded composition,
in the plastisol state, comprising a plasticizing
medium, at least one acrylic resin, dispersed in said
plasticizing medium, and an intumescent agent.

15 It is generally already known that there are
composite yarns, which the Applicant manufactures and
sells, comprising:

- a core comprising a continuous yarn, especially
made of an inorganic material, for example glass;
- 20 - a sheath or jacket comprising a matrix
consisting of at least one chloropolymer material, for
example a polyvinyl chloride (PVC);
- a flame-retarding mineral filler incorporated
into and distributed in said matrix; and
- 25 - a plasticizer.

Preferably, but not exclusively, such a yarn is
obtained by coating the core with a plastisol
comprising the chloropolymer material, for example PVC,
and the plasticizer, and then by gelling the plastisol
30 around the core.

Moreover, the Applicant has disclosed a
halogen-free flame-retarded plastic composition,
described in document FR-A-2 755 973, applicable to a
substrate, such as a yarn made of a mineral or organic
35 material, of natural or synthetic origin, such as
glass, polyester, polyamide, polypropylene,
polyethylene, and containing no halogen or halogenated
compound. This flame-retarded plastic composition

includes a binding fraction, which binds said composition, and an intumescent agent consisting at least of a strong-acid compound, which is thermally degradable, and a polyhydric carbon compound. Said
5 binding fraction as such has a limiting oxygen index (LOI) at least equal to 25% and the intumescent agent essentially consists of said strong-acid compound and said polyhydric carbon compound, the solids content of the composition having a weight ratio of said strong-
10 acid compound to said polyhydric carbon compound of between 1.5 and 2, and preferably of 1.85.

The flamed-retarded composition described may be in solid, molten or liquid form. Preferably, this composition is in the form of an aqueous dispersion.

15 Specialty fabrics obtained from yarns as described above, and when they are used in various environments, especially for furnishing both the interior and exterior of buildings or constructions, for example as blinds, are subject to fire behavior
20 requirements defined by national or international homologation or authorization regulations and/or procedures.

Thus, the regulations applicable to such fabrics in the Federal Republic of Germany define
25 various classifications characterized especially by the length of the specimen destroyed by the fire and by the temperature of the combustion smoke, these classifications being identified by the letters B1 to B3, the letter B1 characterizing the best fire behavior
30 achievable by a material comprising organic materials.

As regards the regulations applicable in France, these also define various classifications characterized, on the one hand, especially by smoke emission and identified by the letters F0 to F5, F3
35 being the best behavior achievable by a material containing a halogenated polymer, and characterized, on the other hand, especially by the ignition time of the fabric and identified by the letters M0 to M4, the

letter M1 identifying the best fire behavior generally achievable by a material comprising organic materials.

For the purposes of meeting the requirements in terms of fire behavior, it is known to incorporate into
5 any plastic composition a suitable intumescent agent, formulated with the resin so as to achieve the required level of flame retardation.

With regard to coating a substrate, and in particular the core of a yarn, with a flame-retarded
10 plastic composition, comprising an acrylic resin and an intumescent agent, the Applicant has sought the most appropriate coating method, that is to say a method capable of preserving, at the end, the properties of the yarn or of the composite structure obtained, in
15 terms of heat-sealability and resistance to both high and low temperatures.

With regard to a yarn, the Applicant has firstly adopted, for this purpose, a coating method in which the core is passed through a die, with peripheral
20 delivery around the core of a sheath of the flame-retarded plastic composition, in the ungelled plastisol state, that is to say with a plasticizing medium in which both the acrylic resin and the intumescent agent are distributed.

This way of applying the flame-retarded plastic composition to the substrate, that is to say in the plastisol state, avoids having to melt the resin, at a
25 high temperature, which might degrade the final properties of the latter and degrade the intumescent
30 agent.

Next, the Applicant sought optimal rheological properties of the flame-retarded compositions according to the invention, compatible with the coating processes using dies with a high shear rate (for example of the
35 order of at least 15 000 to 20 000 s^{-1} or even 100 000 s^{-1}).

According to the invention, this compatibility is obtained when the plastisol exhibits, at low shear rates, for example less than 300 - 400 s [sic],

Newtonian-type behavior with a viscosity of less than or equal to 6000 mPa.s, measured using a Brookfield RVT viscometer at 20 revolutions per minute, and, at high shear rates, for example greater than 10 000 s⁻¹,
5 pseudoplastic-type behavior.

As a person skilled in rheology knows, Newtonian behavior is characterized by a shear stress which varies linearly with shear rate and pseudoplastic behavior is characterized by a shear stress which
10 reaches a limiting value when the shear rate increases.

In the case of the present invention, Newtonian behavior is revealed when it is possible to measure the viscosity of the flame-retarded composition using any suitable method, whether standardized or not, and
15 pseudoplastic behavior is revealed by the ability of the flame-retarded composition to pass, without flow, through a coating die with a high shear rate, for example of the order of 15 000 to 20 000 s⁻¹.

Preferably, so as to preserve the properties of
20 the composite yarn obtained, especially its heat-sealability and its weatherability, the weight proportion of the plasticizing medium comprising a phosphate is at most equal to 200% with respect to the weight of acrylic resin and/or the weight proportion of
25 the intumescent agent is at most equal to 200% with respect to the weight of acrylic resin.

The plasticizing medium comprises predominantly, by weight, an organic phosphate, possibly and preferably with a phthalate.

30 The proportion by weight of intumescent agent is between 50 and 200%, and preferably between 150 and 200%, by weight of resin.

Any composite yarn or any composite textile structure, capable of being obtained by coating and
35 then gelling a flame-retarded composition as defined above may achieve a fire resistance according to French Standard NFP 92503, especially classification level M1, and also good weatherability, meeting the ISO 105 standard, and finally good heat-sealability.

In the description and claims, the terms and expressions indicated below have the following meanings:

5 - an "acrylic resin" is any synthetic polymer derived from propenoic acid;

 - "a thermally degradable strong-acid compound" is a compound which releases a strong acid either by itself or *in situ* from a precursor, at high temperature, that is to say at between about 100°C and
10 about 250°C;

 - "a polyhydric carbon compound" is a compound generally chosen from the various classes of carbohydrates and having a relatively high amount of carbon and many hydroxyl sites;

15 - "a liquid phosphorus derivative" is a flame-retarding product which comprises phosphate groups and is in liquid form;

 - "a gas-generating agent" is a product which, by thermal degradation due to the effect of temperature,
20 releases a gas, for example carbon dioxide or ammonia;

 - "a plastisol in the gelled state" is a dispersion of polymers, fillers and various additives in a plasticizer.

 In another preferred embodiment according to
25 the invention, the flame-retarded plastic composition also comprises a phosphate-type plasticizer. With a phosphate/phthalate-type plasticizer, the performance is better, in terms of low viscosity, and there is less plasticizer exudation after gelling.

30 As examples of phthalate-type plasticizers, mention may be made of the plasticizers PALATINOL C and PALATINOL N available from BASF.

 As phosphate-type plasticizers, mention may be made of DISFLAMOLL DPO and DPK® available from Bayer.

35 As examples of phosphate/phthalate-type plasticizers, mention may be made of those available from Solutia.

In yet another preferred embodiment according to the invention, the acrylic resin is a homopolymer or copolymer based on methyl methacrylate.

Such a resin may, for example, be chosen from
5 the resins BM 310[®] and BM 410[®] available from Röhm.

The flame-retarded plastic composition according to the invention may also include UV stabilizers and/or opacifiers and/or pigments and/or viscosity-reducing processing aids.

10 As UV stabilizers, mention may especially be made of compounds of the benzophenone type, such as TINUVIN P available from Witco, or compounds of the benzotriazole type, such as TINUVIN 320 available from Witco or LOWILITE 55 available from Great Lakes.

15 As opacifiers, mention may especially be made of calcium carbonates and zinc sulfides.

As pigments, mention may especially be made of products from the IRGALITHE or CHROMOPHTAL ranges available from Ciba-Geigy.

20 As viscosity-reducing processing aids, mention may especially be made of the viscosity reducers available from Byk Chemie.

The intumescent agent of the composition according to the invention therefore comprises at least
25 one strong-acid compound.

Preferably, the thermally degradable strong-acid compound is chosen from the group consisting of phosphoric acids, boric acids, and salts of these acids with a volatile cation, and preferably ammonium
30 polyphosphate. This is because the acid source agent is chosen to be able to dehydrate, effectively, the carbon source agent, if it is present, above a certain temperature or in the presence of a flame, and to release the acid in temperature ranges close to the
35 ignition temperature of the substrate to be flame-retarded.

The intumescent agent may also comprise a polyhydric carbon compound. The polyhydric carbon compound is preferably a starch or a polyhydric

alcohol, and more preferably pentaerythritol. This is because these agents contain a relatively high amount of carbon and have many hydroxyl sites, thereby favoring the formation of a highly expanded residue.

5 The intumescent agent may also comprise liquid phosphorus derivatives which make it possible to further reduce the viscosity of the fluid plastisol. These derivatives are preferably chosen from products of the FYROL® range available from Akzo.

10 The intumescent agent may also comprise gas-generating agents such as, in particular, melamine.

In a highly preferred embodiment according to the invention, the flame-retarded plastic composition comprises, by weight:

- acrylic resin	100.00 parts
- phosphate/phthalate plasticizers	125.00 parts
- liquid phosphorus derivatives	5.00 parts
- ammonium polyphosphate and melamine	97.50 parts
- 50/50 pentaerythritol/melamine	52.00 parts

15 Another subject of the invention is a flame-retarded composite yarn comprising a core of low combustibility, made of a mineral or organic material, for example a halogen-free material, and a sheath made of a plastic capable of being obtained from the flame-retarded composition as defined above. The material of
20 the core is, for example, a continuous glass filament.

The core made of halogen-free material of the composite yarn according to the invention may be chosen from the group consisting of a yarn made of a mineral
25 or organic material, of natural or synthetic origin, such as glass, glass filament, polyester, polyamide, polypropylene and polyethylene. Preferably, a core made of a glass yarn or a continuous glass fiber, or filament, will be chosen.

30 The subject of the invention is also a textile structure in which the composite yarns as obtained above are assembled or entangled.

Another subject of the invention is a substrate of low combustibility, for example a textile structure,

coated with a resin layer, obtained by coating and then gelling a flame-retarded composition as defined above.

Further subjects according to the invention are, respectively, a sun screen, a sign, and a covering
5 for walls or ceilings, comprising a textile structure as defined above.

The examples which follow illustrate the invention but do not in any way limit the scope of the
10 appended claims.

EXAMPLE 1: Formulation I of a fire-retarded plastic composition

- 15 • Plastisol:
- Acrylic resin (BM 310 from Röhm) 100.00 parts
 - Phosphate/phthalate plasticizer 125.00 parts
- Intumescent agent:
- Ammonium polyphosphate 120.00 parts
 - Pentaerythritol 31.00 parts
 - Melamine 31.00 parts
- Lubricant:
- Silicone oil 2.50 parts

20

Such a fire-retarded plastic composition has, in its Newtonian range, a viscosity of 4600 mPa.s measured using a Brookfield RVT viscometer at 20 revolutions per minute. Moreover, at high shear
25 rates, it is pseudoplastic.

The fire behavior tests were carried out on glass fabrics coated with the fire-retarded plastic composition described above, as well as on composite yarns formed from about 54% (or 50%) of continuous
30 glass filament and from 46% (or 50%) of the fire-retarded plastic composition described above.

The results of the tests carried out demonstrate that the M1 classification of the NFP 92503 Standard can be assigned to the textiles thus obtained.

5 EXAMPLE 2: Formulation II of a flame-retarded plastic composition

- Plastisol:
 - Acrylic resin (BM 310) from Röhm 100.00 parts
 - Phosphate/phthalate plasticizer 125.00 parts
- 10 • Intumescent agent:
 - Ammonium polyphosphate 38.00 parts
 - Pentaerythritol 31.00 parts
 - BUDIT 3077B fire-retarded system
 (available from Budenheim) 150.00 parts
- Lubricant:
 - Silicone oil 2.50 parts

15 Such a fire-retarded plastic composition has, in its Newtonian range, a viscosity of 6000 mPa.s measured using a Brookfield RVT viscometer at 20 revolutions per minute. Moreover, at high shear rates, it is pseudoplastic.

20 The same tests as those described in Example 1 were repeated, giving the same results.

EXAMPLE 3: Formulation III of a flame-retarded plastic composition

- 25 • Plastisol:
- Acrylic resin (BM 310) from Röhm 80.00 parts
 - Acrylic resin (VP 8744) from Röhm 20.00 parts
 - Phosphate/phthalate plasticizer 130.00 parts
- Intumescent system:
- Ammonium polyphosphate 115.00 parts
 - Pentaerythritol 31.00 parts

- Melamine 31.00 parts
- Liquid phosphorus derivative 5.00 parts
- Lubricant:
 - Silicone oil 2.50 parts
 - Wetting agent 5.00 parts

Such a fire-retarded plastic composition has, in its Newtonian range, a viscosity of 4300 mPa.s measured using a Brookfield RVT viscometer at 20 revolutions per minute. Moreover, at high shear rates, it is pseudoplastic.

The same tests as those described in Example 1 were repeated, giving the same results.

EXAMPLE 4: Formulation IV of a fire-retarded plastic composition

- Platisol:
 - Acrylic resin (BM 310) from Röhm 80.00 parts
 - Acrylic resin (VP 8744) from Röhm 20.00 parts
 - Phosphate plasticizer 130.00 parts
- Intumescent system:
 - Ammonium polyphosphate 115.00 parts
 - Pentaerythritol 31.00 parts
 - Melamine 31.00 parts
- Lubricant:
 - Silicone oil 2.50 parts

Such a fire-retarded plastic composition has, in its Newtonian range, a viscosity of 5250 mPa.s measured using a Brookfield RVT viscometer at 20 revolutions per minute. Moreover, at high shear rates, it is pseudoplastic.

The same tests as those described in Example 1 were repeated, giving the same results.

Many other fire-retarded plastic compositions may be formulated and qualified by routine tests, based on the above examples, and on the following supplementary considerations:

5 1) the final rheological behavior depends largely on the plasticizer used, more specifically on its chemical nature and its proportion; in this regard, a plasticizer comprising a phthalate must be preferred;

10 2) the proportion of the components or compounds in the intumescent agent has little effect on the final rheological behavior, since in particular the actual intumescent properties are desirable; in contrast, the proportion of the intumescent agent is important with regard to the final rheological behavior. This
15 proportion must be limited, otherwise it will impair the fire retardancy;

 3) any viscosity-reducing additive allows these rheological properties to be adjusted, if necessary.

CLAIMS

1. A halogen-free fire-retarded plastic composition suitable for coating a substrate, comprising an acrylic resin and an intumescent agent, characterized in that:

- it is in the plastisol state and comprises a plasticizing medium in which the acrylic resin and the intumescent agent are dispersed;

- it exhibits, at low shear rates, Newtonian-type rheological behavior with a viscosity of less than 6000 mPa.s; and

- it exhibits, at high shear rates, pseudoplastic-type rheological behavior.

2. The composition as claimed in claim 1, characterized in that the weight proportion of the plasticizing medium comprising a phthalate is at most equal to 200% with respect to the weight of acrylic resin and/or the weight proportion of the intumescent agent is at most equal to 200% with respect to the weight of acrylic resin.

3. The composition as claimed in claim 1, characterized in that the plasticizing medium comprises predominantly, by weight, an organic phosphate.

4. The composition as claimed in claim 3, characterized in that the plasticizing medium comprises a phthalate.

5. The composition as claimed in claim 2, characterized in that the proportion by weight of the plasticizing medium is between 100 and 200%, and preferably between 120 and 145%, by weight of resin.

6. The composition as claimed in claim 2, characterized in that the proportion by weight of the intumescent agent is between 50 and 200%, and preferably between 150 and 200%, by weight of resin.

7. A flame-retarded composite yarn comprising a core made of a material of low combustibility, for example a halogen-free material, and a sheath made of

resin, characterized in that it is capable of being obtained by coating said core with the flame-retarded composition as claimed in any one of claims 1 to 6.

8. The yarn as claimed in claim 7, characterized in that the material of the core is a continuous glass filament.

9. A composite structure comprising a substrate of low combustibility, for example a halogen-free substrate, and at least one layer of resin, characterized in that it is capable of being obtained by coating the substrate with a flame-retarded composition as claimed in any one of claims 1 to 6.

10. A textile structure in which yarns as claimed in claim 7 are assembled or entangled.

11. A sun screen comprising a textile structure as claimed in claim 9 or 10.

12. A sign comprising a textile structure as claimed in claim 9 or 10.

13. A covering for walls or ceilings, comprising a textile structure as claimed in claim 9 or 10.

#3

**DECLARATION AND POWER OF ATTORNEY
UNDER 35 USC §371(c)(4) FOR
PCT APPLICATION FOR UNITED STATES PATENT**

As a below named inventor, I hereby declare that:

my residence, post office address and citizenship are as stated below under my name;

I verily believe I am the original, first and sole inventor (if only one name is listed below) or an original, first and joint inventor (if plural names are listed below) of the subject matter which is claimed and for which a patent is sought, namely the invention entitled: FLAME-RETARDED PLASTIC COMPOSITION, YARN AND TEXTILE STRUCTURE COATED THEREWITH

described and claimed in international application number PCT/FR00/00738 filed March 23, 2000.

I have reviewed and understand the contents of the above-identified specification, including the claims, as amended by any amendment referred to above.

I acknowledge the duty to disclose to the Office all information known to me to be material to patentability as defined in Title 37, Code of Federal Regulations §1.56.

Under Title 35, U.S. Code §119, the priority benefits of the following foreign application(s) filed by me or my legal representatives or assigns within one year prior to my international application are hereby claimed:

French Patent Application No. 99 03764 filed March 23, 1999; and

French Patent Application No. 99 04202 filed March 30, 1999.

The following application(s) for patent or inventor's certificate on this invention were filed in countries foreign to the United States of America either (a) more than one year prior to my international application, or (b) before the filing date of the above-named foreign priority application(s):

I hereby appoint the following as my attorneys of record with full power of substitution and revocation to prosecute this application and to transact all business in the Patent Office:

**James A. Oliff, Reg. No. 27,075; William P. Berridge, Reg. No. 30,024;
Kirk M. Hudson, Reg. No. 27,562; Thomas J. Pardini, Reg. No. 30,411;
Edward P. Walker, Reg. No. 31,450; Robert A. Miller, Reg. No. 32,771;
Mario A. Costantino, Reg. No. 33,565; Stephen J. Roe, Reg. No. 34,463;
Joel S. Armstrong, Reg. No. 36,430; Christopher W. Brown, Reg. No. 38,025; and
Richard E. Rice, Reg. No. 31,560.**

ALL CORRESPONDENCE IN CONNECTION WITH THIS APPLICATION SHOULD BE SENT TO OLIFF & BERRIDGE, PLC, P.O. BOX 19928, ALEXANDRIA, VIRGINIA 22320, TELEPHONE (703) 836-6400.

I hereby declare that I have reviewed and understand the contents of this Declaration, and that all statements made herein of my own knowledge are true and that all statements made on information and belief are believed to be true; and further that these statements were made with the knowledge that willful false statements and the like so made are punishable by fine or imprisonment, or both, under Section 1001 of Title 18 of the United States Code and that such willful false statements may jeopardize the validity of the application or any patent issued thereon.

1	Typewritten Full Name of Sole or First Inventor	<u>Isabelle</u>	<u>CONE SA</u>
		Given Name	Family Name
2	Inventor's Signature:	<u>I. Isabelle</u>	<u>CONE SA</u>
3	Date of Signature:	<u>18 October 2001</u>	
		Month	Day
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Note to Inventor: Please sign name on line 2 exactly as it appears in line 1 and insert the actual date of signing on line 3.

IF THERE IS MORE THAN ONE INVENTOR USE PAGE 2 AND PLACE AN "X" HERE ☒

(Discard this page in a sole inventor application)

1 **Typewritten Full Name of Joint Inventor** 2^{su} Francois-Xavier DAMOUR
Given Name Middle Initial Family Name
2 **Inventor's Signature:** Francois-Xavier DAMOUR
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1 **Typewritten Full Name of Joint Inventor** _____
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1 **Typewritten Full Name of Joint Inventor** _____
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Month Day Year
Residence: _____
City State or Province Country
Citizenship: _____
Post Office Address: _____
(Insert complete mailing address, including country) _____

Note to Inventor: Please sign name on line 2 exactly as it appears in line 1 and insert the actual date of signing on line 3.

This form may be executed only when attached to the first page of the Declaration and Power of Attorney of the application to which it pertains.